

ALGEBRA - Forming expressions

Note Title

08/09/2011

Examples

① Tom is x years old. Write down an expression for the age of each of the following people.

(a) Kate, who is 5 years older than Tom $x + 5$

(b) Mum, who is 3 times as old as Tom $3x$

[Note: we don't write the 'x' sign, and we put the number first.
NOT $3 \times x$ or $x3$]

(c) Dad, who is 5 years older than Mum $3x + 5$

(d) Aunt Hilda, who is 3 times as old as Kate.
 $3(x + 5)$

2) I have t grams of chocolate to share between 4 people. How much will each person get?

$$\frac{t}{4} \text{ grams}$$

[Note: we don't usually use a \div sign in algebra instead of $t \div 4$ we prefer $\frac{t}{4}$]

3) b boys and c girls are to be split into n small groups of equal size. How many will be in each group?

$$\frac{b+c}{n}$$

More examples A cup of coffee costs x pence
A cup of tea costs y pence

Write down the cost in pence of the following

① 4 coffees $x \times 4 = \underline{\underline{4x}}$

* In algebra we do not write the \times sign.
We put the number before the letter

② 2 coffees and 3 teas $2x + 3y$

③ I buy 2 teas. How many pence change from a pound coin? $100 - 2y$

④ n coffees $x \times n = \underline{\underline{nx}}$

⑤ x coffees $x \times x = x^2$

* Instead of xx we write x^2 *

⑥ The price of a coffee increases by 5 pence. How much for n coffees now?

$$(x + 5) \times n = n(x + 5)$$

⑦ I buy some cups of tea. The total cost is t pence. How many cups of tea?

$$t \div y = \frac{t}{y}$$

* In algebra we normally write a division as a fraction *

A formula links letters together. We need to say clearly what the letters represent.

Example In this rectangle,



c is the length
 d is the width
 A is the area
 P is the perimeter

Formula for area is $\underline{\underline{A = cd}}$

Formula for perimeter is $\underline{\underline{P = 2c + 2d}}$

Tackling more complex problems

Note Title

25/01/2011

- Don't expect to see how to solve the whole problem (from A to Z) straight away.
If you can see how to get from A to B...
And then you can see how to get from B to C...
And then ...
Then you can get from A to Z!
- Break the problem down into steps; write a few **words** to remind yourself (and anyone else looking at your work) what you are doing.
- Simplify expressions as you go along.
- If you can't see what operation to use for a problem, try thinking of the problem with simple numbers instead of the harder numbers or letters.

Example A group of n children are taken to the theatre. For each child, the cost of travel is x pence, and the theatre ticket costs three times as much as the travel. Each child is given an ice cream which costs 20p less than the travel cost. The total cost is £ P .
Find a formula for P

Method 1

$$\begin{aligned}\text{Cost for 1 child (pence)} &= x + 3x + x - 20 \\ &= 5x - 20\end{aligned}$$

$$\text{For } n \text{ children (pence)} = n(5x - 20)$$

$$\text{In pounds } P = \frac{n(5x - 20)}{100}$$

Method 2

$$\text{Travel : } nx$$

$$\text{Tickets : } n \times 3x = 3nx$$

$$\text{Ice creams : } n(x - 20) = nx - 20n$$

$$\begin{aligned}\text{Total cost : } & nx + 3nx + nx - 20n \\ \text{(pence)} &= 5nx - 20n\end{aligned}$$

$$\text{(pounds)} \quad P = \frac{5nx - 20n}{100}$$